

STATE OF VERMONT
PUBLIC SERVICE BOARD

Joint Petition of Green Mountain Power)	
Corporation, Vermont Electric Cooperative, Inc.)	
and Vermont Electric Power Company, Inc. for a)	Docket No. _____
Certificate of Public Good pursuant to 30 V.S.A. §)	
248, to construct up to a 63 MW wind electric)	
generation facility and associated facilities on)	
Lowell Mountain in Lowell, Vermont and the)	
installation or upgrade of approximately 16.9 miles)	
of transmission line and associated substations in)	
Lowell, Westfield and Jay, Vermont)	

PREFILED TESTIMONY OF
CHARLES PUGHE
ON BEHALF OF GREEN MOUNTAIN POWER CORPORATION

May 21, 2010

Summary of Testimony

Mr. Pughe provides a description of the proposed wind generation and upgraded transmission facilities, as well as their construction, operation and maintenance. He also identifies the subjects of testimony by other witnesses and summarizes their conclusions, and describes the proposed power sales and transmission upgrade agreements with Vermont Electric Cooperative, Inc., the estimated construction and operating costs, and the impacts on governmental services.

PREFILED TESTIMONY OF CHARLES PUGHE
ON BEHALF OF
GREEN MOUNTAIN POWER CORPORATION

1 **1. Q. Please state your name, current position, employer and business address.**

2 **A.** My name is Charles Pughe. I am employed by Green Mountain Power
3 Corporation (“GMP” or “Green Mountain Power”) as the Power Generation Leader. My
4 business address is 163 Acorn Lane, Colchester, Vermont 05446.

5
6 **2. Q. Please state briefly your educational background and business experience.**

7 **A.** I received a Bachelor of Science in Finance from Lehigh University in 1987.
8 From April 1988 until June 1994, I was employed by John Moriarty & Associates, Inc – a
9 commercial general contractor headquartered in Winchester, Massachusetts. I started as a Field
10 Engineer responsible for line and grade, providing field layout and coordination for
11 subcontractors working on the project. I advanced through a series of positions to become
12 Project Superintendent for Tenant Fitup work. After two years in the field, I transitioned to the
13 office side of the business as an estimator, purchasing agent, and Project Executive. I was
14 involved with projects ranging in size of up to \$25 million, including projects in Massachusetts,
15 Connecticut, New York City and Miami, Florida. In June 1994, I relocated to the Burlington
16 Vermont area and became a project manager and owner’s representative on commercial
17 construction projects for a variety of clients including Trammell Crow Company, Xerox, Oxford
18 Health Plans, Dade/Behring, and The Procaccianti Group. Typical projects included office space
19 fitout, data center construction, medical device manufacturing facilities with clean rooms, and

hospitality renovations (hotel), ranging in size of up to \$30 million. On most of these projects, I was the owner's designated representative, working with the design team, contractor and property owner to manage the design, bid, construction work and schedule to meet the project requirements. Since 2006, I have been employed by Green Mountain Power, where I have had responsibilities in field operations, outside contract services, and power generation. My work has included management of annual payroll budgets, project scoping, pricing and execution of capital improvements relating to GMP's generation, transmission and distribution systems. Recently, I became the Project Manager for the Kingdom Community Wind Project (the "Project"), with responsibility for coordination and execution of all aspects of the project, including design, permitting, construction and operations.

3. Q. Have you ever testified before the Public Service Board ("Board")?

A. Yes. I testified in Docket No. 7463, relating to a consumer complaint.

4. Q. Please summarize your testimony.

A. I provide a description of the proposed wind generation and upgraded transmission facilities, as well as their construction, operation and maintenance. I also identify the subjects of testimony by other witnesses and summarize their conclusions, describe the proposed power purchase agreement ("PPA") and joint ownership agreement ("JOA") with Vermont Electric Cooperative, Inc. ("VEC"), the projected construction and operating costs, and the impacts on governmental services, and address miscellaneous subjects.

1 **5. Q. Please describe the areas covered by the remaining GMP and VEC witnesses.**

2 **A.** The following witnesses have provided testimony in addition to myself:

3 1. Robert Dostis (GMP) describes the agreement between GMP and the Town of
4 Lowell providing for minimum annual payments, and the proposed Good Neighbor Fund, which
5 will fund payments to the towns (other than Lowell) closest to the Project. He also describes
6 GMP's outreach efforts and the Lowell vote in favor of the Project on March 2, 2010.

7 2. David Estey (RLC Engineering Inc.) describes the transmission line upgrades and
8 substation improvements. He also addresses whether the Project will have an undue adverse
9 effect on system reliability and stability and whether it can be served by existing transmission
10 facilities.

11 3. Adam Gravel (Stantec) addresses whether the Project will have an undue adverse
12 affect on rare or endangered species or wildlife habitat with respect to birds and bats.

13 4. Ian Jewkes (Krebs & Lansing Consulting Engineers) describes the civil works
14 associated with the access road, crane path and turbine pads, the various stormwater treatment
15 practices (STPs) that will be used, and construction sequencing, blasting plan and access to the
16 construction site.

17 5. Ken Kaliski (Resource Systems Group) addresses whether the Project will meet
18 the sound-related standards established by the Board in past wind project cases.

19 6. Tom Kavet (Kavet, Rockler & Associates) addresses the Project's economic
20 benefits, from the perspective of impact on the local and regional economy, including increased
21 employment and contribution to state and local taxes, and the lack of any negative impact on
22 local property values.

1 7. Craig Kieny (VEC) addresses the proposed PPA from VEC's perspective.

2 8. Charles Knight (UVM Consulting Archeology Program) addresses Project effects
3 on archeological resources.

4 9. Tony Kvedar (GMP) describes the annual and levelized cost per kWh of Project
5 output and describes the impact on GMP's retail rates.

6 10. Jeff Nelson (VHB Pioneer) provides an inventory of streams, wetlands and plant
7 communities in the Project area and provides testimony on associated Section 248 criteria. He
8 also addresses whether the Project will have an undue adverse effect with respect to a number of
9 Section 248 criteria relating to plant communities and soil erosion.

10 11. Mary Powell (GMP) provides a general overview on why GMP has decided to
11 pursue the Project.

12 12. Liz Pritchett (Liz Pritchett Associates) addresses whether the Project will have an
13 undue adverse effect on above-ground historic resources.

14 13. David Raphael (Landworks) addresses whether the Project will have an undue
15 adverse impact on aesthetics or public investment, and whether it will interfere with orderly
16 development of the region.

17 14. Doug Smith (GMP) describes the market value of the Project output and
18 addresses whether the Project is required to meet demand for service, will result in an economic
19 benefit to the State and its residents, is consistent with GMP's Integrated Resource Plan ("IRP"),
20 and is in compliance with the Department of Public Service ("Department") Electric Energy
21 Plan.

22 15. Jeff Wallin (Multiple Resource Management) addresses whether the Project will

1 have an undue adverse affect on rare or endangered species or necessary wildlife habitat with
2 respect to bears, deer and moose.

3 16. Jeff Wright (VEC) addresses the proposed JOA and the proposed transmission
4 upgrades from VEC's perspective.

5 17. John Zimmerman (VERA) identifies the expected wind resource that will be
6 available for electric generation. He also describes the extent of potential ice throw and shadow
7 flicker and whether they will adversely affect public safety or aesthetics.

8
9 **6. Q. Please describe the Project in general terms.**

10 **A.** A topographical map depicting the proposed location of project elements is
11 attached as **Exh. Pet.-CP-1**. The Project will consist of 20-21 turbines, each with a capacity of
12 2.5-3.0 MW and an aggregate capacity of up to 63 MW. The final number and capacity of the
13 wind turbines have not yet been determined, and will depend in large part on the results of on-
14 site wind resource assessment, environmental and other studies. The vendors currently under
15 consideration are General Electric and VESTAS, although we are reviewing other potential
16 vendors, including Seimens and Enercon and it is anticipated that GMP will not select the vendor
17 until after it receives the permits necessary for the Project. Brochures describing the turbines
18 currently under consideration are attached as **Exh. Pet.-CP-2**.

19
20 Depending on the design ultimately chosen, the proposed turbines range in total height from 410
21 feet (125 meters) to 443 feet (135 meters) from ground elevation at the base of the turbine to the
22 tip of a blade at its highest position. The towers supporting the nacelle and rotor assemble are

262 feet (80 meters) to 279 feet (85 meters) tall. The rotors are 295 feet (90 m) to 328 feet (100 m) in diameter. Some of the wind turbines will have Federal Aviation Administration (FAA) required night-time flashing red lights mounted on the nacelle, which is the unit at the hub of the turbine's blades that houses the generator, gearbox and other operational equipment. Based on the proposed layout of turbines, it is anticipated that 9 lights will be required as indicated in **Exh. Pet.-CP-3**. All turbine towers and blades will be painted white or off white.

Access to the turbines will be over approximately 2.5 miles of gravel and/or stone access road from Route 100 in Lowell to the Lowell Mountain ridgeline. The access road width will generally be 18 feet and there will be three pull-over areas where the road width will be 32 feet, to permit vehicles to pass each other. Along the ridgeline, there will be a turbine crane path with a minimum passable width of 34 feet to allow a large crawler type crane to travel between wind turbine sites without the need for disassembly and reassembly. There will be two main Project staging areas, an approximately 5 acre area at the intersection of the Project access road and Vermont Route 100, and an approximately 0.75 acre area located approximately 1.3 miles up the access road from Route 100. The second area is located within an existing clearing that will be expanded from approximately two acres to 4.5 acres to allow for the new collector substation, and maintenance building. See **Exh. Pet.-IAJ-2**.

In addition to the proposed access road, an existing road - Meek Road (Town Highway 25) – will be used during the initial weeks of construction to provide access for construction equipment to the four and one half-acre staging area. Use of Meek Road will reduce the length of the

1 construction period by permitting GMP to construct the access road in two directions with two
2 separate crews. After construction of the access road, which we expect will take approximately
3 nine weeks, Meek Road will continue to be used to provide an alternate access for automobiles
4 and light truck traffic, which will minimize the amount of idling time by vehicles due to the
5 ability to pass oversize equipment only in wider portions of the road. In accordance with GMP's
6 agreement with the Town of Lowell, Meek Road will be maintained by GMP during the
7 construction period and restored to pre-construction condition upon Project completion. A pre-
8 construction walk through with the Town of Lowell Highway Manager will be conducted to
9 establish and document the conditions of Meek Road prior to use by GMP.

10
11 The Project's electric collection system will consist of an underground 34.5 kV line that connects
12 to the wind turbines along the ridgeline, and an overhead 34.5 kV line on wooden poles ranging
13 from approximately 43 feet to 52 feet in height¹ from the underground line down to a new step-
14 up, or collector, substation ("KCW Substation"), which will be located adjacent to the proposed
15 maintenance building. The collector line is shown in **Exh. Pet.-DPE-5, 6**. The electric collector
16 system will then extend west from the KCW Substation to Route 100, on wooden poles
17 approximately 35-52 feet in height. The proposed line will then extend north approximately 2.5
18 miles along Route 100 to the proposed VEC Lowell #5 Substation, on approximately 35-52 foot-
19 high poles. The collector line from the KCW Substation to the Lowell Substation is described in
20 **Exh. Pet.-DPE-2**. In certain sections, the proposed line will also include a distribution
21 underbuild, consisting of open wire construction on cross arms, as well as communications

¹ As with all pole height measurements in my testimony, this refers to above-ground height.

1 attachments. There will be a 100-foot wide cleared area along the overhead collector line, to
2 protect the line from tree damage. GMP will use low growth vegetation and serpentine edge
3 trimming to minimize the visual impact of the cleared corridor.

4
5 The KCW Substation will transform the collector system voltage up to 46 kV. The KCW
6 Substation will be approximately 140 feet by 140 feet and 45 feet in height and will consist of
7 open steel structures, a 34 kV/46kV step up transformer on a concrete foundation, an oil
8 containment system typical for this type of facility, yard lights on a manual switch for
9 maintenance purposes, and perimeter fencing. The control building will be approximately 20 feet
10 by 15 feet and 10 feet high. See **Exh. Pet.-DPE-7**.

11
12 The site maintenance building will be located adjacent to the KCW Substation. This building
13 will be constructed with a metal frame and insulated steel siding. The building will be
14 approximately 30' deep by 70' wide by 30' high. The building roof and siding colors will be
15 selected from among the manufacturer's standard colors to minimize the contrast with the
16 surrounding landscape. The building will be used by the on-site staff for office space, inventory,
17 tools and equipment storage. The building will be equipped with a drive in bay. See **Exh. Pet.-**
18 **CP-4**.

19
20 The VEC Lowell #5 Substation will be consolidated with the VEC Irasburg #21 Substation,
21 located approximately 50 feet away at 2337 VT Route 100 in Lowell. Improvements will consist
22 of an upgrade from 34.5 kV to 46 kV voltage, with all components to be located within the

existing substation fence, and the decommissioning and removal of the components located at the existing Lowell #5 facilities. Facilities to be removed from the existing Lowell #5 facility include: 1 34.5 kV to 12.7 kV step down transformer, steel structure, wire buss, 3 circuit breakers, concrete foundations, and perimeter chain link fence. Upon completion of the removal of the components of the existing Lowell #5 substation and verification that the area of the substation does not contain any hazardous materials, the existing stone pad will be covered with loam and seeded with grass. The area of the substation will be maintained as a grassed area in the future. After the rebuild, the height of the tallest components will increase from approximately 24 feet to approximately 36 feet. Further details concerning the proposed improvements to the Lowell #5 Substation are contained in **Exh. Pet.-DPE-11**.

The existing 10.4-mile VEC 34.5 kV transmission line will be upgraded to 46 kV voltage between the upgraded VEC Lowell #5 Substation and the VEC Jay 17 substation, located southeast of the intersection of State Route 242 and Cross Road. The upgraded line will be located within the existing corridor, except for a few sections that will be re-located closer to Vermont Route 100 for improved maintenance access or to address existing right-of-way infringements from existing structures. The upgraded transmission line will be built in a single-pole configuration similar to the existing transmission line, consisting of open wire on cross arm construction with a distribution under build. The current pole heights of 27-52 feet will be increased to 43-52 feet.

1 The VEC Jay 17 Substation will be upgraded from 35 kV to 46kV voltage. The entire existing
2 substation structures and transformer will be removed from service. The new substation will
3 include a new 46 kV to 12.7 kV step down transformer, and a distribution buss structure
4 incorporating 4 distribution breakers. The existing underground distribution circuits will be
5 reused with the new substation layout. The new substation will be equipped with perimeter
6 fence lighting on a switched circuit to allow for emergency services. Unlike the Lowell #5
7 substation there will not be a control house at this location. All improvements will be within the
8 existing substation fence, and the height of the tallest components will increase from
9 approximately 24 feet to approximately 45 feet. Further details concerning the proposed
10 improvements to the Jay 17 Substation are contained in **Exh. Pet.-DPE-13**.

11
12 The two-mile VEC distribution line extending from the Jay 17 Substation to the existing
13 Vermont Transco LLC (“VELCO”) 46 kV transmission line at the intersection of Route 105 and
14 Cross Road will be rebuilt as a 46 kV transmission line with a distribution line underbuild. The
15 upgraded line will be built in a single-pole configuration similar to the existing line, consisting of
16 open wire on cross arm construction for the transmission and distribution lines. The current pole
17 heights range from approximately 35 feet to 52 feet and will be increased to approximately 43
18 feet to 61 feet.

19
20 Each section of upgraded VEC transmission line will remain largely within the existing right-of-
21 way. In certain sections, the cleared right-of-way may be widened to up to 100 feet, in order to
22 achieve the desired level of reliability by reducing potential line contact by a fallen tree. It is

1 expected that approximately one mile of right-of-way will be relocated closer to the highway, in
2 order to reduce future maintenance costs, to reduce the portions of the line on private property
3 and to address existing right-of-way infringements from existing structures. The collector line
4 and rebuilt transmission lines will include fiber optic cable to facilitate communications for
5 implementation of Smart Grid Technology and operational control of the wind farm and the VEC
6 substations. GMP and VEC are in the process of confirming the adequacy of (and revising
7 where necessary) existing easements for the upgraded transmission line and substations. Further
8 details concerning the transmission line improvements are contained in **Exh. Pet.-DPE-2**.

9 The existing two-mile VELCO 46kV transmission line will be reconductored between the Route
10 105/Cross Road intersection and a new 46kV VEC Jay Tap Switching Station and an adjacent
11 new VELCO Jay Tap Substation (both to be located west of Levitt Circle and south of Route
12 105). The new substation will enable the upgraded 46 kV line to interconnect into the VELCO
13 115 kV transmission system. There will also be new switching structures installed at the
14 intersection of the new 46 kV line and the VELCO 46 kV line.

15
16 The improvements to the VEC Jay Tap Switching Station and the new VELCO Jay Tap
17 Substation are not a part of this petition. VEC filed a request on March 5, 2010 (Docket No.
18 7604) for Section 248 approval of improvements to the Jay Tap Switching Station, which will
19 replace existing pole-mounted switches. VEC is planning to place the switching station in
20 service by Spring 2011.

21

1 The VELCO Jay Tap Substation will include a 115 kV step up transformer and 115 kV taps to
 2 interconnect the new substation with the VELCO 115 kV bulk power system. VELCO and VEC
 3 are currently undertaking planning studies to verify the extent to which the proposed VELCO
 4 substation is required to assure that VEC's load is served in a reliable manner. The results of
 5 these studies will affect the allocation of costs within New England as well as within Vermont.
 6 Based on the current planning schedule, VELCO expects to complete the required studies and
 7 request Section 248 approval of the VELCO Jay Tap Substation by February 2011, and hopes to
 8 complete permitting and construction in time to commence commercial operation by August
 9 2012.

10
 11 **7. Q. Why was the Lowell Mountain site selected for the Project?**

12 **A.** GMP believes this site is highly favorable for the development of a wind electric
 13 generation facility based on a number of factors. These include the anticipated level of the wind
 14 resource, the length of ridgeline available for wind turbines, the presence of existing roads and
 15 the proximity to existing transmission infrastructure, and the absence of environmental or other
 16 impacts that would preclude the ability to obtain necessary permits. Also, the primary property
 17 owner has been working for the past 7 years to develop a wind farm at this location. The ability
 18 to reach agreement with this land-owner for site access, infrastructure and turbine placement
 19 greatly simplifies the process of designing and developing a project.

1 **8. Q. When did GMP begin preparations for filing its Petition?**

2 **A.** GMP began conducting on-site bird and bat studies in the fall of 2008. Site
3 specific evaluations of the natural areas and wildlife communities began in the spring of 2009.
4 These studies were designed to evaluate site conditions, potential impacts on natural
5 communities, birds, bats and mammals, aesthetics, historic sites and sound issues, potential soil
6 disturbance issues, and other site-specific analyses required for a Section 248 petition. GMP
7 began engineering and design work in the late spring of 2009.

8
9 **9. Q. Please describe the overall Project construction schedule.**

10 **A.** GMP's schedule is based on receipt of all required permits and commencement of
11 Project construction in the second quarter of 2011, construction over two seasons, and
12 commercial operation by December 31, 2012. The construction sequence is discussed by Mr.
13 Jewkes.

14
15 **10. Q. Why is GMP planning on an in-service date on or before December 31, 2012?**

16 **A.** The economic viability of the Project depends on the availability of the existing
17 Production Tax Credits ("PTCs") or similar financial benefits. The PTC is a federal credit of 2.1
18 cents per kilowatt-hour. It was established in 1992 and has undergone a series of short-term
19 extensions since then, although it has been allowed to lapse briefly in 1999, 2001 and 2003.
20 Congress most recently extended the PTC in February, 2009 as part of the American Recovery
21 and Reinvestment Act, and it currently expires on December 31, 2012. In order to qualify for the
22 PTC, the wind farm must be in operation by the December, 2012 deadline, unless the PTC is

1 again extended. GMP will not order the turbines nor commence construction if there is not
2 adequate assurance of the availability of PTCs or similar financial benefits at the time the Project
3 is scheduled to begin operation. In order to permit operation by December, 2012, GMP must
4 receive all necessary permits, order turbines and commence construction by the second quarter of
5 2011.

6
7 **11. Q. How will GMP transport the major Project components and equipment to**
8 **the site?**

9 **A.** GMP plans to transport major Project components, including the wind turbines,
10 installation cranes and other oversize equipment, to the Project site from Interstate I-91, along
11 Vermont Routes 58 and 100. Limited road improvements (crushed stone fill at sharp turns and
12 road intersections) will be required to protect the road edges and allow for turning radius of the
13 specialty transport equipment. The roads must be clear to provide room for overhanging
14 components at sharp turns and corners areas adjacent to the travelled portion, which may require
15 temporary removal of signage. Utility lines will be modified in some areas to assure the required
16 overhead clearance. A Vermont Agency of Transportation (“VAOT”) permit for the work will
17 be obtained prior to the scheduled transport of materials. A survey to document existing road
18 conditions will be conducted with VAOT and officials of each affected town prior to transport of
19 the components. Any damage caused by the transport activities will be measured against the pre-
20 transport survey, and GMP will be responsible for any damage identified. A complete
21 transportation plan will be filed after issuance of Section 248 approval.

22

1 **12. Q. Who will own and operate the Project's wind facilities?**

2 **A.** Green Mountain Power will own and operate the wind facility. GMP employees
3 will operate and maintain the facility. The Project will be monitored and controlled remotely by
4 GMP using a SCADA system connected to GMP's control center. The wind turbines will also
5 be monitored by the wind turbine manufacturer (along with its other wind farms) to facilitate the
6 prediction of operational and maintenance issues that might not otherwise be apparent to wind
7 farms that are monitored on a much smaller scale.

8
9 **13. Q. Will the wind farm site be accessible to the public?**

10 **A.** The wind farm is located on private property and vehicular access to the Project
11 area will be controlled by GMP and the property owners. The access road to the site will be
12 gated and locked to prevent unauthorized vehicular access. Local emergency personnel will be
13 provided with a key to obtain access in the event of an emergency. Areas adjacent to the wind
14 farm site have been used by the public to hunt and hike, and appropriate signage will be placed
15 in the area of the turbine providing notice of the potential hazards associated with the operation
16 of the turbines. The ridgeline location of the turbines, however, is relatively remote and requires
17 a hike over fairly steep terrain. GMP anticipates that we will operate public tours of the Project
18 facility similar to the tours conducted at the Searsburg facility.

19
20 **14. Q. What is the anticipated construction and operating cost for the Project?**

21 **A.** I developed the projected construction costs and operating costs for the Project,
22 under the Alternative 1 and 2 scenarios. These costs were used by Mr. Kvedar in his analysis.

1 The expected construction cost of the Project (including the wind farm and GMP's portion of the
2 transmission upgrade) is \$138,610,000 under the Alternative 1 scenario and \$154,750,000 under
3 the Alternative 2 scenario. As indicated by Mr. Kvedar, the projected first year cost of service is
4 \$18,440,000 under Alternative 1 and \$20,910,000 under Alternative 2. A pro rata portion of the
5 costs of the wind farm are to VEC under the proposed PPA and a pro rata portion of the
6 transmission upgrade costs are allocated to VEC under the proposed JOA (both described
7 below). See **Exh. Pet.-CP-5**. The projected construction and operating costs identified above
8 are based on estimates that have been developed over the past several months; we will provide
9 updated estimates in connection with the rebuttal testimony.

10
11 The Alternative 1 scenario assumes that the VELCO Jay Tap Substation is needed by VEC for
12 reliability purposes and certain of the associated costs are treated as Pool Transmission Facilities
13 and allocated throughout New England. The Alternative 2 scenario, on the other hand, assumes
14 that these costs must be borne by GMP and VEC. I expect that the studies necessary to
15 determine the allocation of these costs will be complete by July, 2010.

16
17 **15. Q. Please describe the proposed GMP-VEC PPA.**

18 **A.** As reflected in the term sheet attached as **Exh. Pet.-CP-5**, GMP proposes to sell
19 to VEC energy, capacity and environmental attributes corresponding up to 8 MW of Project
20 output, depending on the actual capacity of the wind farm. VEC's portion will be the full 8 MW,
21 based on the projected 50-63 MW range of Project capacity, which corresponds to a 16% -
22 12.7% share of the output. The price is based in general terms on a pro rata allocation of GMP's

1 cost, plus an amount equal to two times GMP's development costs (including site acquisition,
2 wind measurement and permitting costs).

3
4 **16. Q. Please describe the proposed GMP-VEC JOA.**

5 **A.** Under the proposed JOA, GMP will be entitled to a share of the capacity of the
6 upgraded transmission facilities equal to 75 MW or the wind farm capacity (whichever is less),
7 and VEC is entitled to the remaining capacity. GMP will use its share to transmit the wind farm
8 output to the VELCO 115 kV system, including the share VEC will purchase under the proposed
9 PPA.

10
11 VEC will convey to GMP 58.46% of its interest in the transmission facilities between the Lowell
12 #5 Substation and the proposed VEC Jay Tap Switching Station and associated easements, and
13 VEC will retain a 41.54% share. This allocation reflects the anticipated allocation of use of the
14 upgraded facilities between GMP and VEC. GMP and VEC will outsource the design and
15 construction of the jointly-owned facilities, by competitive bid, to mutually agreeable vendors
16 and they will jointly approve all designs. Once built, VEC will maintain the upgraded
17 transmission facilities. The cost of construction and maintenance of the upgraded transmission
18 facilities will be allocated on the same 58.46% / 41.54% basis. GMP will not own nor pay for
19 any distribution equipment, except for distribution-related costs necessary to facilitate
20 transmission upgrades.

21

1 The JOA is contingent on the receipt of all permits and approvals necessary for both the
2 transmission upgrade and the wind farm. A copy of the JOA term sheet is attached as **Exh. Pet.-**
3 **CP-5.**

4
5 **17. Q. What permits are required for the Project, other than Section 248 approval?**

6 **A.** The Project will require the following permits from the Vermont Agency of
7 Natural Resources (“ANR”): (1) construction and operational phase stormwater discharge
8 permits for the wind farm and associated infrastructure, (2) a Wetlands Conditional Use
9 Determination (“CUD”) for portions of the transmission line upgrade that cross Class II
10 wetlands, (3) a Water Quality Certification relating to impacts to streams and wetlands, (4) a
11 Stream Alteration Permit for stream crossing impacts, (5) a Hazardous Waste Facility Certificate
12 for the liquids contained in the wind turbine nacelles and the KCW Substation, (6) a Wastewater
13 System and Potable Water Supply Permit for the maintenance building, and (7) potentially a
14 Threatened and Endangered Species Takings permit concerning construction-related impacts on
15 certain plants. Vermont Agency of Transportation (“AOT”) permits are required before doing
16 any work within the state highway right-of-way and before transporting heavy or wide loads in
17 excess of statutory limits. A Determination of No Hazard to Air Navigation must be obtained
18 from the FAA and a Notice of Actual Construction must be filed with the FAA. The Project will
19 also require a United States Army Corps of Engineers Section 404 Permit under the Clean Water
20 Act for depositing of fill or dredged material in waters or adjacent wetlands, for site development
21 fill for commercial developments, or for placement of riprap and road fills. The Project may also
22 require a U.S. Fish and Wildlife Service Endangered Species Act Consultation and Incidental

1 Take Permit relating to the incidental (as opposed to intentional) “take” of any fish or wildlife
2 species listed under the federal Endangered Species Act of 1973. Finally, the Project is subject
3 to a so-called Federal Section 106 review, relating to potential impacts on historic sites, as a
4 result of the need for other federal permits.

5
6 **18. Q. What is the expected life of the Project?**

7 **A.** The Project is expected to operate for 25 years, based on routine maintenance and
8 component refurbishment, and for a longer period if the wind farm is repowered by refurbishing
9 the turbines. Repowering the facility will likely result in lower annual Project costs because a
10 substantial portion of the Project, including the transmission upgrade, access road and turbine
11 foundations and supports, will already have been amortized.

12 At the end of the life of the wind farm, it will be decommissioned in a manner consistent with the
13 decommissioning plan, attached as **Exh. Pet.-CP-6**. As reflected in the decommissioning plan,
14 GMP will remove the wind turbines, and the above-ground portion of the foundations, collector
15 system, KCW Substation and maintenance building. The areas excavated during the
16 decommissioning process will be graded to provide for permanent soil stabilization and to
17 promote establishment of appropriate vegetation. Those portions of the access road that are
18 not used for logging and the ridgeline crane path will be allowed to re-vegetate naturally.

19

1 **19. Q.** Has GMP acquired the necessary rights to build and operate the wind farm from
2 the landowners where the wind farm will be located?

3 **A.** Yes. GMP has acquired easements and related rights necessary for the
4 construction and operation of the wind farm and related infrastructure from the owners of land in
5 the areas in which the wind farm and related infrastructure will be located, except that we have
6 not yet obtained all necessary consents as to one of the landowners. The terms of the
7 arrangements are for approximately 47 years.

8
9 **20. Q.** **Have GMP and VEC acquired all of the easements necessary for the**
10 **transmission upgrade?**

11 **A.** No. GMP is currently pursuing transmission easements in cases where the
12 existing easements are insufficient. These include areas where the existing corridor must be
13 widened or the existing line will be relocated.

14
15 **21. Q.** **Have there been any changes to the Project since the 45-day notice?**

16 **A.** Yes. The number of turbines has been changed from 20-24 to 20-21. The
17 provision for temporary construction access by means of Meek Road was not identified in the
18 notice. In addition, there have been adjustments in the access road length (from 2.25 to 2.5
19 miles), crane path width (from 36 to 34 feet), KCW Substation height (from 40 to 45 feet), and
20 pole heights for the segments between the underground collector and the KCW Substation (from
21 43 feet to 43-52 feet) and along Route 100 to the Lowell #5 substation (from 43 feet to 35-52
22 feet).

1 **22. Q. Will the Project have an undue adverse impact on transportation systems**
2 **under 10 V.S.A. § 6086(a)(5)?**

3 **A.** No. The Project will not cause unreasonable congestion or unsafe conditions with
4 respect to the use of highways, waterways, railways, airports, or airways. All public roads will
5 be able to accommodate the expected volume of construction and operational traffic without
6 creating unsafe operating conditions or excessive congestion. See **Exh. Pet.-CP-7**. Adequate on-
7 site parking for workers and staging of materials will be available at the lower staging area
8 directly adjacent to Route 100 and at the maintenance building area. The two areas total over six
9 acres of available parking and staging. It is anticipated that materials and components for the
10 turbines will be delivered directly to the proposed turbine locations. As indicated above, GMP
11 will file a complete transportation plan after issuance of Section 248 approval.

12
13 There will be navigational lighting in compliance with FAA guidelines. See **Exh. Pet.-CP-3**.
14 The FAA has issued permits for the proposed wind turbine sites as attached in **Exh. Pet.-CP-8**.

15
16 **23. Q. Will the Project have an undue adverse impact on educational services under**
17 **10 V.S.A. § 6086(a)(6)?**

18 **A.** No. The Project will not cause an unreasonable burden on the ability of the town
19 of Lowell to provide educational services. The Project construction period spans two
20 construction seasons. It is unlikely that temporary workers' dependents would relocate to the
21 area for these two seasons. GMP anticipates that during the Project's operation, up to three full-

1 time employees will be working at the site. These employees will not cause an undue burden on
2 the local schools. See **Exh. Pet.-CP-7**.

3
4 **24. Q. Will the Project have an undue adverse effect on public health or safety?**

5 **A.** No. The turbines will be located over 3,000 feet from the nearest full time
6 residence and the access road gate will prevent unauthorized vehicular access. Pedestrian access
7 will be difficult because the nearest public road will be over 2,500 feet away and access to the
8 turbines would require a rigorous hike. There will also be signage providing notice of the
9 potential hazards associated with the operation of the turbines.

10
11 The plant will be SCADA equipped and will be monitored and controlled 24 hours a day, 7 days
12 a week remotely through GMP's Control Center. In the event of operational conditions arising
13 that could pose a hazard to the plant or create a public safety issue, GMP's Control Center
14 personnel will take corrective actions including shutting equipment down, dispatching
15 maintenance personnel to the site or contacting the appropriate emergency management
16 personnel to address the issues.

17
18 Mr. Zimmerman's testimony demonstrates that there is no unreasonable risk to the public due to
19 ice throw from the Project's turbines.

1 **25. Q. Will the Project have an undue adverse impact on municipal and**
2 **government services under 10 V.S.A. § 6086(a)(7)?**

3 **A.** No. The Project will not cause an unreasonable burden on the ability of the local
4 governments to provide municipal or governmental services. The on-site private roads of the
5 facility will be maintained by GMP. Any modifications to the existing town roads required by
6 the Project will be made at GMP's expense. Additional traffic during the Project's operational
7 phase will not cause an unreasonable increase in the traffic or excessive wear and tear on the
8 existing state or town roads, and any specific damage to the roads caused by transport of Project
9 components will be repaired. Waste disposal will be handled by local private haulers and will
10 not cause any additional burden on the Town of Lowell.

11
12 In its agreement with the Town of Lowell, GMP has agreed to offer free fire and rescue training
13 to Lowell and surrounding towns to assist in the safe and effective evacuation of personnel from
14 the site in case of a medical or other emergency. The Lowell Agreement also requires GMP to
15 provide all specialized equipment required for this training and work at the site, such as
16 specialized harnesses for ascending the wind towers and appropriate vehicles to access the
17 Project site during winter months. GMP has discussed the Project's safety needs as part of its
18 public outreach with Lowell. The Project will not cause an undue burden on municipal services
19 involving emergency or first responders. See **Exh. Pet.-CP-7**.

20
21 The Project will also provide a substantial net benefit to Lowell through the payment of an
22 annual fee, which is described in the testimony of Mr. Dostis.

SUMMARY OF COMPLIANCE WITH SECTION 248(b) CRITERIA

26. Q. Please summarize the Project's compliance with the criteria of 30 V.S.A. § 248(b).

A. The Project complies with all applicable criteria, as described in the summary of testimony of various GMP witnesses below.

Orderly Development of the Region – 30 V.S.A. § 248(b)(1)

Mr. Raphael demonstrates that the Project will not unduly interfere with the orderly development of the region and that there are no undue adverse aesthetic impacts on public investments.

Need for the Project – 30 V.S.A. § 248(b)(2)

Mr. Smith explains that approximately three quarters of GMP's current power supply sources will expire between 2012 and 2015, leaving GMP with a need for substantial new resources, particularly long-term resources that provide price stability, and that this gap cannot be addressed by efficiency, load management or similar measures.

System Stability and Reliability – 30 V.S.A. § 248(b)(3)

Mr. Estey indicates that the Project will not have an undue adverse impact on system stability and reliability, based on the Feasibility Study for the Project, and that a System Impact Study is expected to be completed and filed in this proceeding later this year.

1 **Economic Benefit to the State – 30 V.S.A. § 248(b)(4)**

2 As discussed by Mr. Smith and Mr. Kieny, the Project will also benefit the state by providing a
3 stably-priced in-state source of renewable energy that is expected to compare favorably to
4 alternative new renewable generation over the life of the Project. Mr. Kavet identifies other
5 Project benefits to the state and its residents, relating to additional jobs and tax revenues.

6
7 **Act 250 Criteria – 30 V.S.A. § 248(b)(5) and (8)**

8 The Project will not have an undue adverse effect under these criteria, for the reasons discussed
9 in my testimony and the testimony of witnesses Nelson, Gravel, Pritchett, Wallin, Raphael,
10 Knight, Zimmerman, and Kaliski.

11
12 **Public Health and Safety**

13 As indicated above and in Mr. Zimmerman's testimony, the Project will not create an
14 unreasonable risk of danger to the public health and safety.

15
16 **Air Purity – 30 V.S.A. § 248(b)(5)**

17 As indicated in Mr. Nelson's testimony, the Project will not result in undue air pollution because
18 no air emissions will occur during the operational phase of the Project and because the bedrock
19 present at the Project site does not contain asbestos or otherwise pose special health or
20 environmental hazards associated with the short term project blasting and construction
21 disturbance.

22

Water Purity; Outstanding Resource Waters; Headwaters – 10 V.S.A. § 1424a (d). 10
V.S.A. § 6086(a)(1)(A); 30 V.S.A § 248(b)(8)

As Mr. Nelson testifies, there are no outstanding resource waters near the Project, and although the Project is located in a headwaters area, there will be no adverse impacts because the Project will conform to applicable water quality regulations and GMP will comply with a Spill Prevention, Control and Countermeasures Plan, a preliminary draft of which is attached in **Exh. Pet.-JAN-5**.

Waste Disposal – 10 V.S.A. § 6086(a)(1)(B)

Mr. Nelson states that the Project will not involve the injection of waste materials into the ground, will meet any applicable health and environmental conservation department regulations, and construction debris will be removed from the Project site and disposed of in accordance with all applicable rules and regulations.

Water Conservation – 10 V.S.A. § 6086(a)(1)(C)

Mr. Nelson indicates that the Project will only require minimal water for construction (for dust control) and no water for operation, and that water conserving fixtures will be used at the maintenance building.

Floodways – 10 V.S.A. § 6086(a)(1)(D)

Mr. Nelson testifies that there are FEMA-mapped floodways within the Project's transmission component, but there will be minimal alterations of waterways, and that the Project will not

1 restrict or divert the flow of flood waters, endanger the public during flooding or significantly
2 increase the peak discharges.

3
4 **Streams – 10 V.S.A. § 6086(a)(1)(E)**

5 Mr. Nelson states that the Project components that are adjacent to the stream banks will be
6 designed to maintain the natural condition of the stream, and that the access road and required
7 stream crossings have been designed to minimize stream impacts.

8
9 **Shorelines -10 V.S.A. § 6086(a)(1)(F)**

10 Mr. Nelson states that there are no shorelines near the wind farm and that where the upgraded
11 transmission crosses areas that may be considered shorelines, they will be stabilized to prevent
12 erosion and the banks and vegetation will be retained in their natural condition.

13
14 **Wetlands -10 V.S.A. § 6086(a)(1)(G)**

15 Mr. Nelson indicates that all delineated wetlands within the wind farm area are Class III
16 wetlands. As Mr. Nelson states, where Class II wetlands and buffers exist along the transmission
17 ROW, GMP will select the practicable route with the least wetland and buffer impact.

18
19 **Sufficiency of Water and Burden on Existing Water Supply – 10 V.S.A. § 6086(a)(2), (3)**

20 As Mr. Nelson testifies, the Project will involve minimal use of water during the construction
21 and operational phases, the Project's well will be sufficient for its reasonably foreseeable needs
22 and thus the Project will not cause an unreasonable burden on an existing water supply.

Soil Erosion – 10 V.S.A. § 6086(a)(4)

Mr. Nelson states that an Erosion Prevention and Sediment Control Plan (EPSC Plan) will be developed to ensure that the Project will not cause unreasonable soil erosion or reduction in the capacity of the land to hold water.

Transportation Systems, Education and Government Services
10 V.S.A. § 6086(a)(5), (6), (7)

The Project will not cause an undue adverse impact in these areas for the reasons described above.

Scenic or natural beauty; aesthetics; historic sites – 10 V.S.A. § 6086(a)(8)

Mr. Raphael's testimony demonstrates that although the Project will cause an adverse effect on aesthetics, the impact will not be undue under the *Quechee* analysis because the Project does not conflict with a clearly written community standard intended to preserve the aesthetics of the area, reasonable mitigation steps have been taken, and the Project is not shocking or offensive to the average viewer. Mr. Raphael also demonstrates that the Project is consistent with applicable town and regional plans.

Mr. Kaliski's testimony demonstrates that, based on an analysis of the proposed wind turbines and modeling techniques, the Project will not produce sound at levels that exceed the Board's standards identified in the Deerfield and Sheffield cases. Mr. Kaliski concludes that the construction activities and operational characteristics of the proposed wind farm will not create sound levels that would intrude on people's lives.

Ms. Pritchett's testimony states that, based on the *Middlebury College* analysis, the Project will not have an undue adverse effect on above-ground historic sites within the five-mile Area of Potential Effect (APE). With respect to the Nelson Farm, for instance, she concludes that while the addition of the turbines will create an adverse impact, the impact will not be undue because the turbines will not interfere with the public's ability to interpret and appreciate the historic qualities of the site.

Mr. Knight's testimony demonstrates that the Project will not have an undue adverse impact on archeological resources. No historic period archeological sites were identified during site inspection or background research, although areas along the transmission route and at the lay down area require further study, which will be undertaken this Summer. As long as the appropriate archaeological study(s) are completed in accordance with the Vermont guidelines for conducting archaeology in Vermont and approved by the Vermont Division for Historic Preservation, then the proposed Project will have no undue adverse effect.

Rare and irreplaceable natural areas – 10 V.S.A. § 6086(a)(8)

Mr. Nelson states that the Project will not have an undue adverse effect on rare and irreplaceable natural areas ("RINAs") under 10 V.S.A § 6086(a)(8) because there are no known significant natural communities, except along the transmission route on the Westfield/Lowell town line, and that undue adverse impacts on these communities can be avoided.

Wildlife, Including Necessary Wildlife Habitat and Endangered Species 10 V.S.A. § 6086(a)(8)(A)

Mr. Nelson states that the Project will not have an undue adverse affect on endangered plant species. He found only one state protected plant in the Project area (Male Fern) which will not be affected by the Project. As demonstrated by Mr. Wallin's testimony, the Project will not have an undue adverse effect on large mammals and any impact on necessary bear feeding areas can be adequately mitigated by conserving adjacent bear feeding and habitat areas. Finally, Mr. Gravel's testimony states that, based on a number of field studies and a thorough review of data relating to other regional wind projects, the Project will not have an undue adverse effect on birds or bats.

Development Affecting Public Investments – 10 V.S.A. § 6086(a)(9)(K)

Mr. Raphael states that, based on his aesthetic analysis, the Project will not have an undue adverse effect on public investments.

**Consistency with Principles of Resource Selection
Contained in GMP's IRP – 30 V.S.A. § 248(b)(6)**

As discussed by Mr. Smith, the construction of the Project is consistent with the Company's approved IRP, which identifies new renewable generation as one of several types of electric supply resources that should have priority in the GMP's planning and procurement activities.

1 **Consistency with DPS Electric Plan – 30 V.S.A. § 248(b)(7)**

2 As explained by Mr. Smith, the Project is in compliance with the electric energy plan approved
3 by the Department under section 30 V.S.A. § 202.

4 **Can be Served Economically**
5 **by Existing or Planned Transmission Facilities – 30 V.S.A. § 248(b)(10) –**
6

7 Mr. Estey demonstrates that the upgraded transmission facilities, together with the proposed
8 VELCO Jay Tap Substation, will be adequate to serve the wind farm.

9
10 **27. Q. Does this conclude your testimony?**

11 **A. Yes.**